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Time critical targets in Fleet battle experiment - Foxtrot

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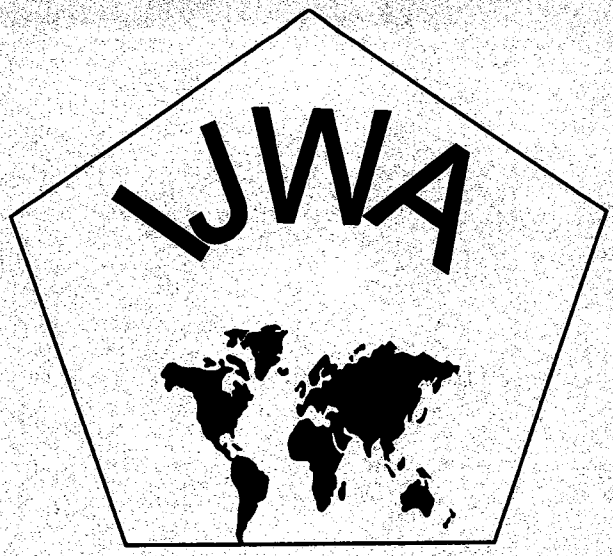
IN

FLEET BATTLE EXPERIMENT - FOXTROT



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Introduction

This report presents data with respect to response to time critical targets (TCTs) in Fleet Battle Experiment Foxtrot (FBE-F) as collected from the LAWS server on USS JFK. The purpose of this report is to provide a means for issuing some initial data related to performance of a Joint Fires Element (JFE), an experimental organization deployed for the purpose (among others) of responding to TCT's within a target's dwell time (prior to the target's opportunity to attack or move prior to itself being attacked). Land Attack Warfare System (LAWS) was a tactical tool combining system processes and data flows as a set of functions within the larger systems of Fires, JFE, C2, COP etc. Therefore LAWS provided convenient and inherent access to data resulting from system functions. It is this set of data that has been collected together here, specifically with respect to TCT processes. Conclusions which may be drawn from this data are not presented here, but will be proposed together with the larger set of data combined in a final FBE-Foxtrot report. One question, which might be asked, is why so few targets were apparently prosecuted. A separate experiment (e.g., LOE or a future FBE) should be structured to answer this question. One possible conclusion, which may be stated here, is that LAWS performance, as a component of JFE cannot be evaluated from these results. Some recommendations are made to improve data capture capability of LAWS as an analytic resource.

The primary assumption underlying this analysis is that all of the targets presented in the LAWS Mission Coordination: Fires list were TCTs. GISRS-M, which nominated about one third of the targets in the list, confirms that all their nominations were TCTs. The principal broad conclusions drawn from the analysis are listed below.

1. About half the TCT nominations were engaged.
2. Of the targets engaged, about one third were engaged with MLRS.
3. Of the targets not engaged, about half may not have been engaged as result of inadequate time, data or resources.
4. For those targets with sufficient timeline data on which to base a conclusion, almost no targets were engaged within the specified target dwell time.
5. There does not appear to be much relation between the experimentally observed sensor to engagement threads and the 16 TCT threads defined in the Fleet Battle Experiment Foxtrot Fires and Precision Engagement Roadmap.
6. The LAWS data contain many voids.

Each of these points is discussed in more detail below.

TCTs Engaged

The LAWS Fires mission list contained 218 targets. Of these, 14 targets (nominated by C5F LAWS and JPJ LAWS) were deleted because the target description contained the word "test". In addition, 28 targets received at LAWS prior to December 4 (all nominated by

PTW+) were deleted, leaving a sample of 176 targets. A target was defined as fired on if the Fired Status block (the FRD column) in the Mission Coordination: Fires table was green. A green FRD block indicates that the LAWS terminal received an acknowledgement from the firer that the mission was fired. Other targets, which do not exhibit this condition, were also considered to be fired on. In the sample of 176 targets there are three that have a red block labeled NAK (not acknowledged) in the FRD column. This means that the mission timed out without receiving an acknowledgement from the firer that the mission was fired. There were a further seven missions that are yellow in the FRD block. For unknown reasons, these blocks did not time out (were not turned red). For the purpose of this report, it is assumed that targets that are yellow or red in the FRD block have been fired on, although in reality what is indicated is only that they may have been fired on. Finally, there are six TACAIR missions listed as flown but only one of which shows a green FRD block. It is also assumed in this report that these targets have been fired on. Operating under these assumptions, 93 (53%) of the 176 TCTs critical targets were fired on. GISRS-M was the nominator of 72 (41%) of the 176 targets. The data for GISRS-M nominations are more complete and considered to be more reliable than for the sample as a whole. Accordingly, the GISRS-M data will be looked at independently of the data summed over all nominators. For GISRS-M, 28 of its 72 nominations (39%) were fired on.

TCT Firers

Table 1 provides a breakdown of the weapon types employed against the TCTs that were fired on. It is emphasized that these data apply only to the engaged targets. In some cases, the targets that were not engaged were matched with specific firers. These unprosecuted matchings are not contained in **Table 1**. Almost half of the 93 targets engaged (44%), were engaged with MLRS. For the GISRS-M nominations, 32 percent of the engaged targets were engaged with MLRS.

TCTs not Engaged

Table 2 presents those TCTs not fired on and gives a breakdown of the reasons why the targets were not fired on. In many cases, the LAWS Mission Coordination: Fires table provides the reason for not firing the mission in the form of a three letter indicator displayed on a red or cyan Element Approval block (the TGT column). In some cases, the remarks or other data in the LAWS Viewing Fire Mission/Targeting Information window provided a plausible reason the target was not engaged. Below, these reasons have been divided into four classes:

1. Not a desirable target.
   a. Dumb target (DMB).
   b. Redundant target. Target already being processed (RUT).
   c. Not High Value. Does not meet attack guidance (NHV).
   d. Target killed (KILL).

2. Operational constraints.
   a. Effects not achieved. Weapon system not effective (ENA).
   b. Target in a no fire area (NFA).
   c. Route in conflict (RTE).
   d. Friendlies in area (FRD).
   e. Restricted fire area (RFA).
   f. High target speed (SPD).
   g. The nominator defined the Not Later Than (NLT) time as equal to the acquisition time (N=A).

3. Denied (DEN)
   These missions were denied for unspecified reasons. If more information were available they would probably fall into classes 1 or 2.

4. Deficiency of data, time or resources.
   a. Past intelligence cutoff time or additional target intelligence required (INT).
   b. Require mensuration data (MEN).
   c. No known reason for not engaging (?).

It is assumed the targets in this class 4 were not prosecuted due to a deficiency of time, target information or resources. As table 2 indicates, about half (57%) of the targets defined as not fired on fall into class 4. The corresponding figure for the GISRS-M nominator is 52%.

Timelines

In principle, LAWS provides the data to create a timeline for each TCT mission. The LAWS Viewing Fire Mission/Targeting Information window has data fields for acquisition time and No Later Than (NLT) time. In addition, the LAWS Mission Timeline Report reports (ideally) and provides a time tag for a number of events in the process of prosecuting a TCT. These include: time the target nomination was received at the LAWS server (At FSC), time at which a fire when ready command was transmitted from LAWS to the fire direction system (the XMT When Ready event) and the receipt of a confirmation that the mission has been fired (the Fired Report event). Unfortunately, in many instances, one or more of these events and associated times are missing, or are in error, for missions that otherwise appear normal. Although the Mission Coordination: Fires lists contains 93 missions that have been defined as fired, the majority of these had insufficient data to construct a complete mission timeline.

Figure 1 presents a histogram of the interval from acquisition time until the nomination was received at the LAWS server for missions that were fired.

Figure 2 presents a histogram of the interval from receipt of the target nomination at the LAWS server until fire. To provide the fire time, the ideal would be to use the Fired Report time from the firing unit. However this time was lacking or in error (particularly for MLRS

7. It would be helpful to expand the event data reported in the Mission Timeline report to routinely include other event data, e.g., acquisition time, expected time to engage, receipt of mensuration data, and receipt of route data.

8. The target priority specified in the LAWS Mission Coordination: Fires table bears no relation to the target priorities in the Attack Guidance Matrix. A uniform definition of priority should be established.

9. In only two of the seven cases where a target was denied because it was redundant (RUT) was the target it was redundant with identified. The operator should always specify the redundant target.

10. There are cases where TGT is not green (e.g. GS0070 = reviewed blue, GS2127 = denied RUT, PT0214 = red) but FRD is green. It is presumed these are cases where the LAWS operator chose to override the review or denial. It would seem less confusing if the fire override automatically changed TGT to green.

11. There are cases where there is no denied or reviewed condition exhibited in the Mission Coordination: Fires table, but in the Viewing Fire Mission window, the Reason field, which displays the reason for a denial, contains a value (e.g. LE0034, Not High Value; JS0108, Intelligence). This appears to be an inconsistency.

12. There are a several cases where the mission was fired but the LAWS data contain no information on the identity of the firer. It is understood that for MLRS missions the specific fire unit and munition are specified by AFATDS and it is not known to LAWS, but in the FBE-F Mission Coordination: Fires table many MLRS missions do have firer and munition data. The operator should at least specify the mission is MLRS.

13. Most of the JSOTF nominated targets had acquisition times entered only as hr:min. Operators should specify all times in dd:hh:mm .

14. All times should be expressed in the same reference frame. At present, the acquisition and NLT times are reported in the Viewing Fire Mission/Targeting Information window in Zulu time. The Mission Timeline report gives event times in local time.

15. The nominators/LAWS operators need to be more specific with regard to the sensors acquiring a target. ELINT and PI are too generic, at least the platform type that the acquiring sensor is mounted on should also be identified.
16. The nominators/LAWS operators need to develop a standard terminology for the LAWS data fields. In particular, target type and acquiring source.

TABLE 1. FBE-F TCTS FIRED ON

		#TARGETS	FIRER TYPES					
NOMINATOR	# TARGETs	FIRED ON	MLRS	TTLAM	ERGM	LASM	TACAIR	UNKNOWN
1 CAV 2BDE	5	0						
GISRS-M	72	28	9	7	1	3	4	4
JSWS	19	7	5		1	1		
C5F LAWS	10	7	1		4			2
JFK LAWS	7	4			2	2		
JYG LAWS	2	2			2			
DOCC LAWS	20	20	18					2
PTW+	22	17	8	3		4	2	
JSOTF	19	8		2		5	1	
TOTALS	176	93	41	12	10	15	7	8

TABLE 2. FBE-F TCTS NOT FIRED ON

		#TARGETS	NOT DESIRABLE				OPERATIONAL CONSTRAINTS								LACK DATA		
NOMINATOR	# TARGETs	NOT FIRED ON	DMB	RUT	NHV	KILL	ENA	NFA	RTE	FRD	RFA	SPD	N=A	DEN	INT	MEN	?
1 CAV 2BDE	5	5															5
GISRS-M	72	44	4	3	4	1	1	1	2			3	2		7	3	13
JSWS	19	12				1			1						6		4
C5F LAWS	10	3		1													2
JFK LAWS	7	3		1											1		1
JYG LAWS	2	0															
DOCC LAWS	20	0															
PTW+	22	5			2				1					1			1
JSOTF	19	11		2	3					1	1				1	1	2
TOTALS	176	83	4	7	9	2	1	1	4	1	1	3	2	1	15	4	28
			TOTAL=22				TOTAL = 13							1	TOTAL = 47		

DMB = Dumb target

RUT = Redundant target. Target already being processed

NHV = Not high value. Does not meet attack guidance

KILL. Remarks in the Targeting Information window indicate the target has been killed.

ENA = Effects not achieved. Weapon system not effective

NFA = No fire area

RTE = Route in conflict

FRD = friendlies in area

RFA = restricted fire area

N = A. The LAWS Targeting information window gives target acquisition times and Not Later Than times that are identical

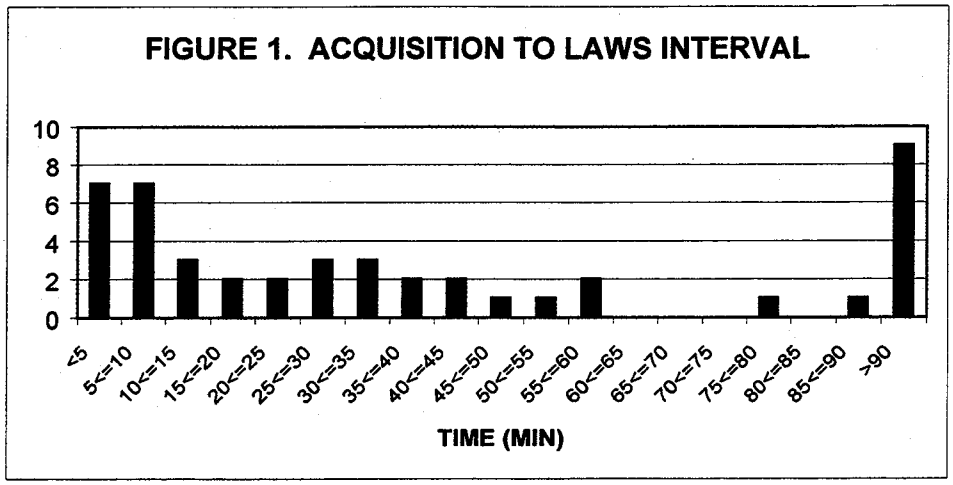
DEN. Target denied for no specified reason.

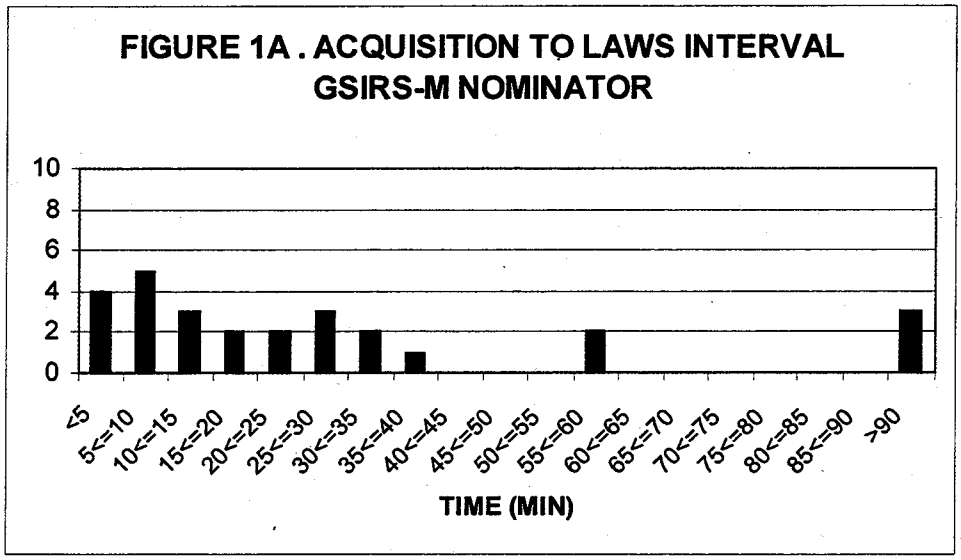
SPD. Remarks in the Targeting Information window report a high speed for the target

INT= Intelligence. Past intell cutoff date. Remarks indicate this flag is also used to indicate needing additional intel data.

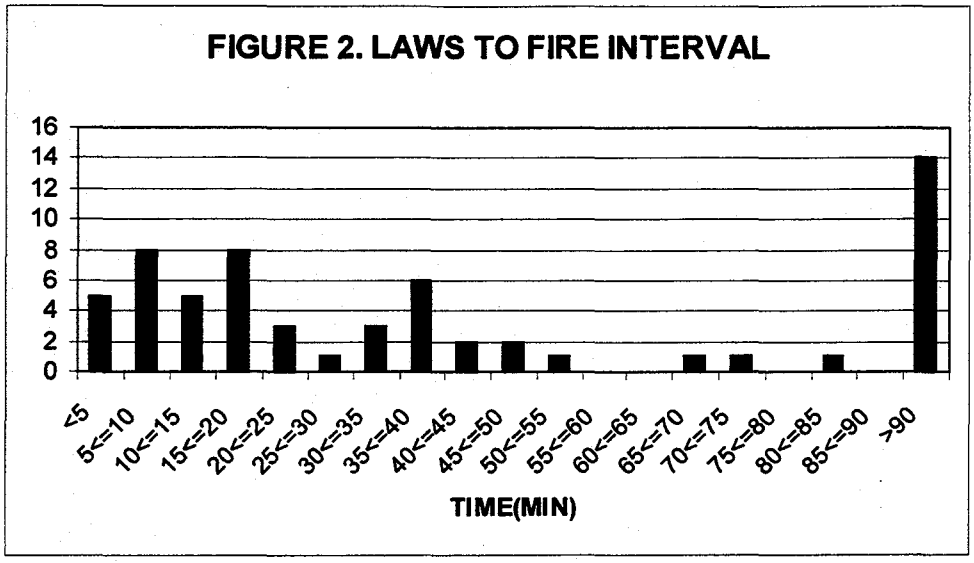
MEN = Need mensuration data.

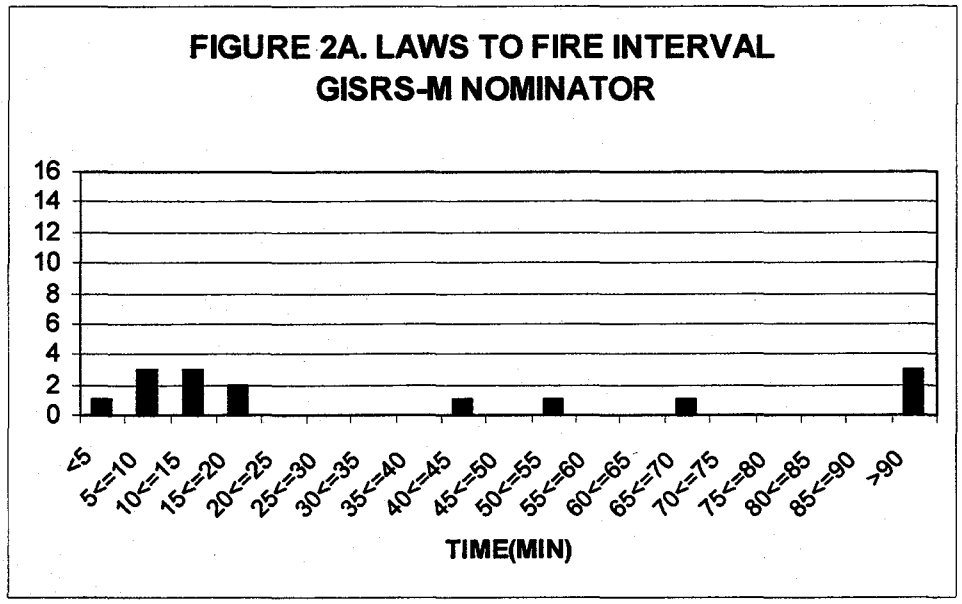
? The reason the target was not fired on was not indicated and is not obvious from the operator remarks.



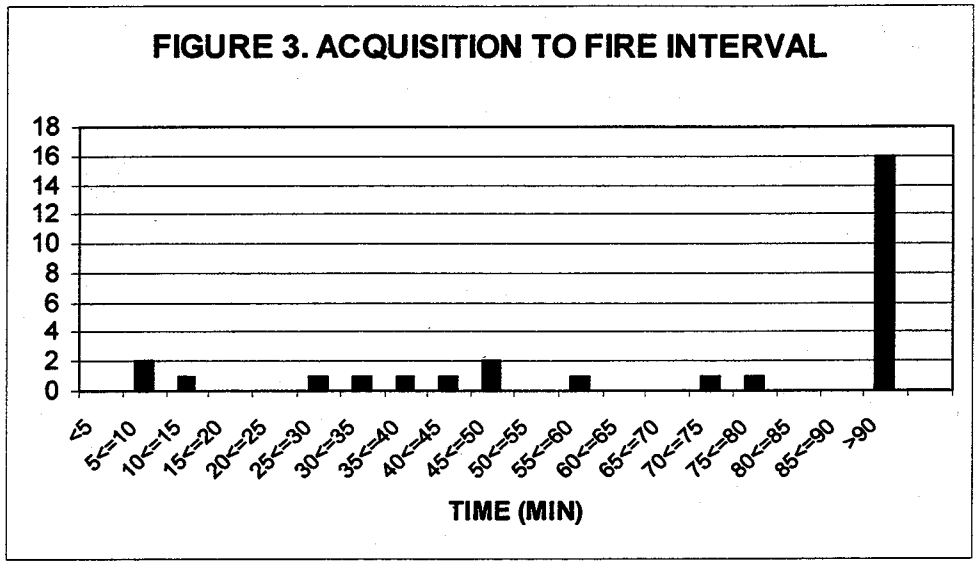


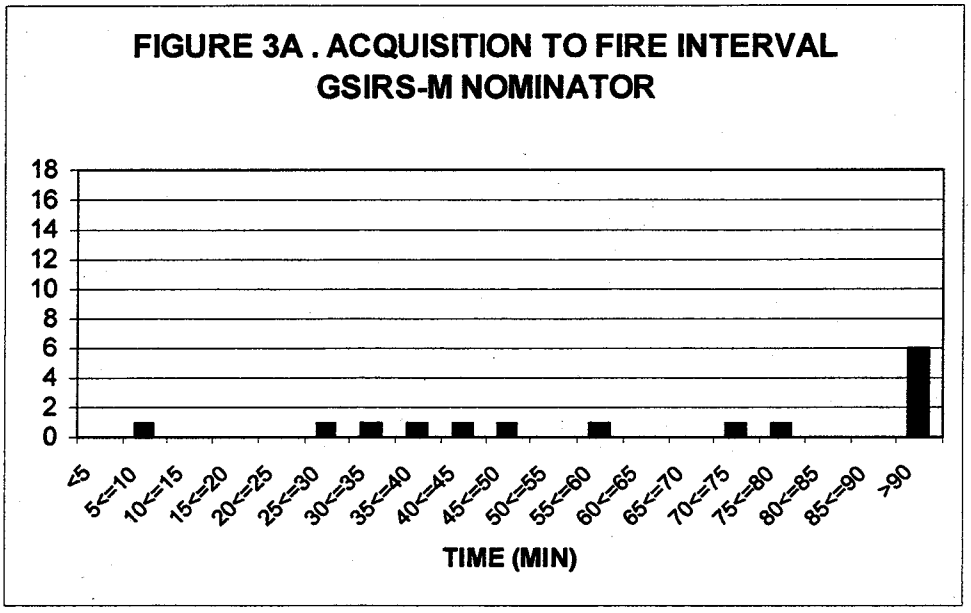
Figures 1 and 1A present the intervals between the sensor acquisition time and the time the target was received at LAWS. Figure 1 includes data for all nominators. Figure 1A includes data only for the GSIRS-M nominator.





Figures 2 and 2A present the intervals between the time the target was received at LAWS and the time the Fired Report event was received at LAWS from the firer. When there was no Fired report Event, the time the fire when ready command was transmitted to the firer was used in place of the Fired Report time. Figure 2 includes data for all nominators. Figure 2 A includes data only for the GSIRS-M nominator.





Figures 3 and 3A present the intervals between the sensor acquisition time and the time the Fired Report event was received at LAWS from the firer. When there was no Fired report Event, the time the fire when ready command was transmitted to the firer was used in place of the Fired Report time. The reported times represent lower limits to the engagement times for TCTs because of these missing Fired Report times and because weapon time of flight is not included. Figure 3 includes data for all nominators. Figure 3A includes data only for the GSIRS-M nominator.

TABLE 4. SENSOR TO ENGAGEMENT THREAD FOR THE GISRS-M NOMINATOR

SENSOR	RPV						ELINT						PI					
WEAPON	TTLAM	MLRS	LASM	ERGM	TACAIR	?	TTLAM	MLRS	LASM	ERGM	TACAIR	?	TTLAM	MLRS	LASM	ERGM	TACAIR	?
TARGET																		
SAM	1	3	1			2			1			1						
CM						1								1				
BM	1	1																
M	1	1										1		1				
AAA																		
PTG	3			1	3													
ATT BOAT																		
SUB					1													
ACFT			1															
RADAR							1							1				
ANTENNA																		
BLDG																		
AMMO DP																		
?																		
TOTALS	6	5	2	1	4	3	1		1			2		3				

SAM = Surface to Air Missile
CM = Cruise Missile position
BM = Ballistic Missile position
M = Missile position
AAA = Air Defense Artillery position
PTG = Patrol Boat, missile
ATT Boat = Fast attack boat
ACFT = aircraft
AMMO DP = Ammo dump
? = unknown

PI = Photo Interpretation

TABLE 5. SENSOR TO ENGAGEMENT THREAD FOR THE PTW NOMINATOR

SENSOR	RPV						ELINT						PI					
WEAPON	TTLAM	MLRS	LASM	ERGM	TACAIR	?	TTLAM	MLRS	LASM	ERGM	TACAIR	?	TTLAM	MLRS	LASM	ERGM	TACAIR	?
TARGET																		
SAM													2		1			
CM																		
BM																		
M														2				
AAA																		
PTG		3									1			1	2			1
ATT BOAT																		
SUB																		
ACFT																		
RADAR														2	1			
ANTENNA																		
BLDG													1					
AMMO DP																		
?																		
TOTALS		3									1		3	5	4			1

SAM = Surface to Air Missile
CM = Cruise Missile position
BM = Ballistic Missile position
M = Missile position
AAA = Air Defense Artillery position
PTG = Patrol Boat, missile
ATT Boat = Fast attack boat
ACFT = aircraft
AMMO DP = Ammo dump
? = unknown

PI = Photo Interpretation

TABLE 6. SENSOR TO ENGAGEMENT THREAD FOR THE JSWS NOMINATOR

SENSOR	SLAR					
WEAPON	TTLAM	MLRS	LASM	ERGM	TACAIR	?
TARGET						
SAM		3				
CM						
BM						
M			1			
AAA				1		
PTG						
ATT BOAT						
SUB						
ACFT		1				
RADAR		1				
ANTENNA						
BLDG						
AMMO DP						
?						
TOTALS		5	1	1		

SAM = Surface to Air Missile
CM = Cruise Missile position
BM = Ballistic Missile position
M = Missile position
AAA = Air Defense Artillery position
PTG = Patrol Boat, missile
ATT Boat = Fast attack boat
ACFT = Aircraft
AMMO DP = Ammo dump
SLAR = Side Looking Airborne Radar
? = unknown

TABLE 7. SENSOR TO ENGAGEMENT THREAD FOR THE JSOTF NOMINATOR

SENSOR	SEAL SR						SOF TM					
WEAPON	TTLAM	MLRS	LASM	ERGM	TACAIR	?	TTLAM	MLRS	LASM	ERGM	TACAIR	?
TARGET												
SAM	1				1							
CM			1								3	
BM												
M												
AAA			1				1					
PTG												
ATT BOAT												
SUB												
ACFT												
RADAR												
ANTENNA												
BLDG												
AMMO DP												
?												
TOTALS	1		2		1		1				3	

SAM = Surface to Air Missile
CM = Cruise Missile position
BM = Ballistic Missile position
M = Missile position
AAA = Air Defense Artillery position
PTG = Patrol Boat, missile
ATT Boat = Fast attack boat
ACFT=Aircraft
AMMO DP = Ammo dump
? = unknown

TABLE 8. SENSOR TO ENGAGEMENT THREAD FOR THE LAWS NOMINATORS

SENSOR:	UNKNOWN					
WEAPON	TTLAM	MLRS	LASM	ERGM	TACAIR	?
TARGET						
SAM		3		2		
CM				2		
BM						
M		4				1
AAA						
PTG						
ATT BOAT			1	1		
SUB						
ACFT				1		
RADAR		7				
ANTENNA		2				
BLDG		2		1		1
AMMO DP		1				1
?			1	2		
TOTALS		19	2	9		3

LAWS nominators include:C5F LAWS, JFK LAWS, JYG LAWS and DOCC LAWS.

In almost all cases the acquiring sensor was not specified.

SAM = Surface to Air Missile
CM = Cruise Missile position
BM = Ballistic Missile position
M = Missile position
AAA = Air Defense Artillery position
PTG = Patrol Boat, missile
ATT Boat = Fast attack boat
ACFT = Aircraft
AMMO DP = Ammo dump
? = Unknown